REMARKS

Claims 2, 3, 9 and 10 are cancelled. Claims 1, 4 and 8 are amended. No new matter is added by the amendments.

Claims 1 and 4-10 are rejected under 35 U.S.C. §112, second paragraph as being indefinite. Applicant traverses the rejection to the extent that it can be maintained. Claims 9 and 10 are cancelled.

The expression "insulating film between layers" is replaced with the art recognized expression "interlayer insulator". A quick search of the USPTO data base found 885 patents that use "interlayer insulator", and a scan of several of these patents showed that the term is used without further definition and in a manner consistent with Applicant's use. An interlayer insulator refers to an insulating film that provides electrical insulation between multi-layer wiring structure. The interlayer insulator may or may not be sandwiched between two layers. With respect to the term "or" in the last line of claim 1, Applicant respectfully points out that via holes and wiring gutters are different structures and therefore, the term "or" is appropriate. The typographical error with respect to "resist" in claim 1 is corrected. Examiner is requested to withdraw the rejection on this ground.

Claims 1 and 4-10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yu (US 6,387,819). Applicant traverses the rejection to the extent that it can be maintained. Claims 9-10 are cancelled.

Applicant's invention includes the conditions for an ashing process (using oxygen gas plasma to remove a resist mask on a silica based interlayer insulator under an atmospheric pressure from 0.01 Torr to 30.0 Torr). These conditions are not taught or suggested by Yu. Yu discloses an ashing process in column 8, lines 13-37, however the pressure for the ashing process is not disclosed at all.

The method of claim 1 prevents Si-H bonding, etc., from being cut and thereby prevents the dielectric constant from becoming higher. Achieving this can be attained by the conditions for an ashing process as mentioned above, and the effect of such conditions is supported by the embodiments, the comparative embodiment, and FIGS. 3-6.

On the other hand, the Yu patent only discloses a damascene method using a low K material, and fails to disclose or suggest steps of claim 1, e.g., the conditions for an ashing process.

The low K material disclosed in the Yu patent (column 4, line 53 - column 5, line 12) has high content of carbon, which is apparent from the schematic of FIG. 2. A representative low dielectric material used by Yu is CYCLOTENE (column 4 line 67) which has a carbon content of about 74 % by atomic weight (product specification attached). In contrast, according to claim 1, the carbon content is low, specifically in the range of 5% to 25 % by atomic weight.

The etching step, the ashing process step under the conditions specified by claim 1, and the carbon content of interlayer insulator are not disclosed by Yu. Furthermore, there is no motivation in the prior art to perform the claimed method under the specified conditions because the effects as discussed above with respect to claim 1 have not been appreciated by the prior art.

Examiner argues that "it would have been desirable to form the SOG layer in the process taught above (i.e. by Yu) such that the SOG layer provides adequate insulation between adjacent circuitry ..." While it may be true that adequate insulation between layers is desirable, Yu simply does not teach or suggest the method discovered by Applicant to achieve that result. The Examiner seems to rely on the teachings of Applicant to support his conclusion. Further, to the extent the knowledge of one skilled in the art is relied upon to provide the missing teachings from Yu, Examiner is obliged to articulate "the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of ... the invention to make the combination in the manner claimed." *In re Kotzab*, 55 USPQ2d 1313 (CAFC 2000) This Examiner has failed to do.

Yu fails to teach or suggest Applicant's invention as a whole. Therefore, claim 1, and the claims which depend from it, are non-obvious over Yu and are patentable.

In view of the above, it is submitted that the application is in condition for allowance. Reconsideration is requested. Allowance of claims 1 and 4-8 is earnestly solicited.

Respectfully Submitted,

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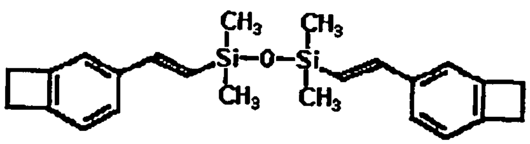
BCB Properties



BCB monomer

Typical Properties

- Dielectric constant (ε_r): 2.65 ε_r vs freq.
- Dissipation factor (tan δ): 0.0008 – 0.002 (1 MHz – 10 GHz)
- High Frequency (400 - 1500 GHz)
- Breakdown voltage: 3.0 x 10^6 V/cm
- Volume resistivity: 1 x 10^{19} ohm-cm
- Moisture uptake
- Index of refraction vs wavelength
- Infrared spectrum
- UV/visible spectrum
- Transmission spectrum (300-800nm)
- Density : 1.05 (cured film)
- CTE vs temp
- Tg: > 350°C % cure vs Tg
- Tensile strength: 87 MPa
- Tensile modulus: 2.9 gpa
- Tensile elongation: 8%
- Stress vs temp
- Thermal stability

Other Features of BCB Resins

- Excellent planarization:
  CYCLOTENE* 3000 Series Resin
  CYCLOTENE 4000 Series Resin
- < 5% shrinkage during cure
- Negligible volatile evolution during cure
- Cure kinetics low cure temperatures (210°C - 250°C) vs rapid cures (seconds-minutes)
- No copper migration
- Film retention
- BCB Processing at University/Technology Centers